DOCUMENT RESUME

ED 308 195 SP 031 553

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TITLE	Classroom and School Improvement in Two European Counties. Laboratory Policy Paper.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	Jan 89
NOTE	19p.; For other documents related to the Regional Educational Laboratory recompetition of 1990, see SP 031 546-556.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Comparative Analysis; Core Curriculum; Elementary Secondary Education; Foreign Countries; Higher Education; *Information Dissemination; Preservice Teacher Education; *Program Implementation; *Research and Development; *Research Utilization; *Theory Practice Relationship
IDENTIFIERS	Hungary; *Regional Educational Laboratories; Sweden

ABSTRACT

This paper examines the steps taken in Sweden and Hungary to improve schools. A description is given of the social-political-economic context of each of these countries, noting their similarities and differences. Particular focus is upon the role played by educational research and development efforts in the two countries, and most particularly on the dissemination of knowledge and techniques to the different levels of each school system. The following questions are addressed: (1) How appropriate are the research and development efforts to the school level? (2) Has the research been well conceptualized? (3) Is the research responding to a known need? (4) Do the schools have a mechanism to help determine the type of work which research and development centers should undertake? and (5) How is research and development for school improvement disseminated? A comparison is made between the research and development work in the two countries with particular focus on the implementation of research results in the schools. (JD)

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ED308195

LABORATORY POLICY PAPER

CLASSROOM AND SCHOOL IMPROVEMENT IN TWO EUROPEAN COUNTRIES

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January 1989

This is one of several papers about the regional laboratory program, or functions which laboratories perform, which the Office of Educational Improvement (OERI) in the U.S. Department of Education has commissioned. The purpose of the papers is to assist planning for the 1990 recompetition of awards to operate regional laboratories. This paper has been written under contract to the U.S. Department of Education. No endorsement by OERI or the Department of Education should be inferred.

SP031553

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School and Classroom Improvement in two European Countries

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Research activities in education take place in universities, teacher training colleges, in special research institutes, and in governmental units either at the central Ministry or regional level. The themes or issues being researched are sometimes given by the government and sometimes are initiated by individual institutes or researchers. Such research typically includes the evaluation of the system for participation rates and achievement levels, investigation of the sequence of concepts and the complexity of language used in different grade groups, selection techniques, methods of instruction and the like.

Development activities in education are usually undertaken in the same institutional settings as research. However, development activities often occur at the school or district level. Development is primarily in the area of curriculum materials but also in the realms of special issues such as developing the "best" way of organizing small or isolated schools, developing training courses for principals, developing teaching-learning strategies, developing appropriate technology and so on.

R and D activities are undertaken for information required for decision making at different levels of the system: national, state, district or school (Ross and Postlethwaite, 1988). In some research, it is possible to generate results that are of use at all levels. However in general, it is useful to be aware of the different levels for which results are being produced, irrespective of the level at which the activities are initiated, before planning a project.

A final step is the **dissemination of knowledge and techniques** to the different levels of the system for which such knowledge is appropriate. Of particular interest in this paper is dissemination to the school level which results in school and classroom improvement. This last step is dependent on the appropriateness of the research and development that has taken place. Has it been well conceptualised in the first place? Is it responding to a known need? If not, it might well be perceived as only an academic game and unrelated to the needs of the schools. Do the schools have a mechanism to help determine the type of work which R and D centers should undertake?

Much has been written about the links between educational research, educational policy-making, and the implementation of research results (Weiss, 1979, Husén and Kogan, 1984) and of the enormous complexity of these relationships. Much has also been written on the institutional inertia or the resistance to change that is built into institutions. Many persons have a vested interest in the status quo. In order to bring about change, it is necessary to convince those affected that the change is in their

interest. Communication is a necessary but not sufficient condition to bring about change (cf. Husén, 1968). I assume that readers know of these discussions and will not enter such debates. Rather, I will describe the steps taken in two European countries (in alphabetical order Hungary and Sweden) to improve schools and classrooms.

Context.

Education as well as educational R and D and implementation take place within a social-political-economic context. It is, therefore, desirable to mention a few basic facts about each system. All three countries have small populations. Hungary has about 11 million people, the Netherlands about 14 million, and Sweden about 8 million.

Some basic facts

Hungary has compulsory education from 6 to 16 years of age. All students are in a unified school system split into 4 grades of basic, 4 grades of general lower secondary schools, and then, from the age of 14, either an upper secondary school (academic), vocational secondary school or trade school. Forty percent of an age group is enrolled in Grade 12.

Sweden has compulsory schooling from the age of 7 years to 16 years. Ninety percent of an age group is enrolled in school at Grade 11 but this declines to 30 percent at Grade 12. There is a unitary comprehensive school system up to age 16 and thereafter 2, 3 or 4 year tracks in arts and social subjects, economics and commercial subjects, scientific and technical subjects, academic general, and vocational.

In Sweden, teachers are paid well above the GNP per capita whereas in Hungary the teachers are only paid about 80 percent of the GNP per capita. There are currently teacher demonstrations and strikes in Hungary for more pay. Recently a new, independent trade union for teachers was established.

Both countries have relatively high achievement in Science (IEA, 1988, p. 42) and this was one reason for selecting these school systems. The differences between schools in achievement as a proportion of the differences (variance) among students varies considerably. At Grade 8/9 level it is 29 percent for Hungary and 8 percent for Sweden. Thus, from one point of view equality of opportunity has been achieved most in Sweden and only to a limited extent in Hungary.

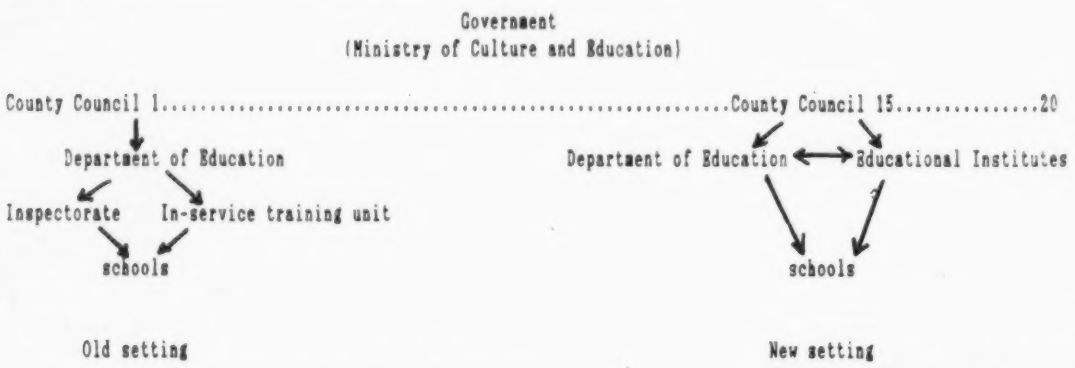
Centralisation/Decentralisation

Hungary: In 1948, a Stalinist form of socialism was established. Given the form of traditional Prussian administration which had existed before this time, the result was extreme centralisation. For education, this meant the central administration of all schools and a central curriculum ("curriculum is the law" was one slogan of the times).

At the end of the 1960s and in the 1970s there were increasing moves to establish a 'new deal' (meaning decentralisation) throughout all aspects of the society. The reform in education tended to follow other reforms. In 1985 new legislation in education came from the top down. The main aims of the legislation were to decentralise administration and policy and create more participation and innovation at the school level. More and more liberty is given to the schools in matters such as curriculum, educational programs, school organisation, teaching methods and the like.

Hungary is divided into 20 counties of which one is the capital. Each county has a department of education. Traditionally, the county councils are strongholds of bureaucracy and orthodox political views. In order to counterbalance these county councils new county educational institutes were set up and staffed by former inspectors of education and persons from in-service training institutes. Figure 1 presents the old and new settings.

Figure 1: Old and new settings in Hungary



The educational institutes are becoming the "extended arm" of the government's reform policy. These educational institutes are a major key to school improvement.

There are three central institutes of educational research and development: the National Institute for Education (curriculum development, evaluation research, school experiments), the Educational Research Institute (macro level research on educational needs of the society, planning of education (system-level, economics), tertiary education etc.) and the National Institute for Educational Technology. It is rare for universities and colleges to conduct empirical research in education. There is an automatic dissemination (publications, seminars, special meetings) of the results of the R and D work at the central level to the County Educational Institutes. These, in turn, deal with each of the schools in their areas both through inspectors' visits and compulsory in-service training.

The Hungarian system has a core curriculum and relatively good pre-service training. As we shall see later it also has a good communication system from top to bottom and bottom to top of the administrative system.

Sweden: Sweden has a constitutional monarchy with parliamentary representative democracy written into its constitution. Education has a high profile within the country. Each of the last three prime ministers in Social Democratic governments have also been education ministers before becoming prime minister. There is political stability. Between 1932 and 1976 the Social Democrats were in power, practically without interruption. Unemployment is low and material prosperity high.

Figure 2 represents the levels in the administration at which various categories of R and D work are carried out.

Figure 2: **Administrative levels in Sweden at which R and D work is conducted.**

Activities	Initiation Planning	Conducting	Follow up
Research	NBE (CEC)	Universities	NBE
Central development work	NBE (CEC)	NBE (CEC)	NBE
Regional development work	CEC	CEC, LEA	CEC
Local development work	LEA	LEA	LEA,CEC, NBE
R&D information	NBE	NBE,universities, CEC LEA, publishers	NBE

Above the diagram is the Parliament and Ministry of Education. It is Parliament which defines the overall goals and guidelines for education. It issues regulations and Ordinances and gives instructions to the National Board of Education (NBE), the 24 County Education Committees (CECs), the Municipal Education committees and local education authorities (LEA). The NBE is the national authority for primary and secondary schooling (and also adult education). The NBE must ensure that the goals and guidelines of the Parliament and Ministry are put into effect and, if necessary, revised. The CECs supervise schools in the county, distribute state grants, and support and encourage school development work. The NBE and CECs together have the task of ensuring the improvement of schools.

Municipal Education Committees and Local Education Authorities have the overall responsibility for the actual school work. Schools and adult education are predominantly a municipal responsibility and one of the largest items on the municipal budget. The Municipal Education Committee decides school policy. This school policy is then put into effect by the Local Education Authority and its officials. However, the country has a national curriculum for schools at all levels, national testing programs and, more recently, a national assessment program.

Each school is directed by a principal, but planning involves consultations with staff and pupils and - in the case of compulsory schools - with the parents as well. Teacher unions are strong.

The Swedish school system rests on the principle of guaranteeing all children equivalent basic education, irrespective of residential locality or parental income. This is why goals and guidelines and the curriculum are decided by the Riksdag and why there is a national school administration.

The costs for compulsory and upper secondary education is shared roughly equally between the State and the Municipalities.

In 1988 the NBE had approximately 6 million US dollars for R and D work (for research, central development work including curriculum development and revision of materials, and the dissemination of information about R and D). The CECs had about 3 million dollars altogether to disseminate local development work. The LEAs had about 60 million US dollars for in-service teacher training, local development work in general and some specifically ear-marked development activities in schools.

Figure 2 shows the bodies that initiate, undertake and follow up the work. There are several points which should be mentioned. The NBE has a mechanism for canvassing ideas for research from schools via LEAs and CECs as well as from universities and from unions including teacher unions and parent associations. The NBE sets the final priority for its funding. However, the CECs and LEAs can also initiate development work for school improvement on their own.

There are no research institutes for education outside the universities and schools of education, nor are there any separate institutes for evaluation and test construction. According to the Swedish research policy, research should be carried out within the universities and rely on the scientific competence there. This means that the universities are the body for basic training, research training, basic research, commissioned research as well as pre-service and in-service teacher training.

Researchers from many disciplines are engaged in educational research and development work: pedagogy, sociology, psychology, political science, natural sciences, humanities, linguistics, and foreign language departments. Departments of education in particular are engaged in evaluation activities such as the construction of the standardized tests used in compulsory and upper secondary education and in the Swedish national assessment programme. The final decisions concerning standarized tests and the instrument used in the national assessment programme are taken by NBE, however.

There is a core curriculum laid down centrally and much effort is given to INSET (In-service training of teachers). However, INSET is built on national priorities to which LEAs adhere and this is a powerful instrument for dissemination. INSET

consisting of five mandatory study days per year is compulsory and it is the responsibility of the school leaders (principals). From 1989 all teachers in the compulsory school (grundskolan) are expected to participate in a 2-3 week course aimed at deepening the understanding of educational goals. Class-teachers are further expected to participate in INSET about mother-tongue (2-3 weeks), and mathematics and/or Science (5 weeks). This program is planned to be completed for all teachers within 10 years. Thereafter, any teacher can take a one term (5 months) INSET course in a subject or subject area of his or her own choice.

Questions to be answered

1. How is R and D for school improvement produced or obtained?

R and D is determined nationally but conducted at central, regional, and school levels in **Hungary**. The total amount of money available is approximately 0.5 percent of the primary and secondary school national budget.

One central committee decides on the distribution of funds for R and D. The committee has 15 members. The chairperson is a political appointee and he/she then chooses 14 other persons, typically professionals. This committee solicits ideas for R and D from researchers (at universities and at the three national institutes concerned with education: the National Institute of Education, the National Educational Research Institute, and the National Institute for Educational Technology), from the County Departments of Education and Educational Institutes, and from schools. Most submissions come from the researchers but about one third of submissions come from schools. Only rarely do submissions come from the county level.

The criteria used for determining priorities are:
1. **Social relevance** (in this case projects likely to help the new educational reform);
2. **Quality** of proposed research methodology;
3. **Prestige** of researcher or research group.

Experts - and in some cases even members of the committee - write an expert appraisal (Gutachten) of each submission and this is then reviewed by the committee. It is of interest that the local schools receive slightly more than one third of the money available (because there are relatively many experimental schools, run by alternative programmes).

Two examples of school development projects are given. In one school three teachers applied for money to develop and evaluate (using empirical methods) in several schools an integrated social studies curriculum. They undertook the development work. The curriculum materials, after several try-outs and revision were approved by the National Institute of Education (which must approve any curricular materials). More and more schools are using this curriculum and materials. There was a successful similar project in mathematics. A second example is that one teacher proposed a project for a special music school (à la Wiener Sängerknaben). The project is now under development.

It is to be noted that the school level R and D is mostly development/innovation but does use some empirical research methods in the small scale try-out phase. It is the central institutes that tend to conduct the more research oriented studies.

As can be seen from Figure 2 presented earlier, in **Sweden** the NBE determines all, or nearly all, research projects and sub-contracts the conduct of these projects to the universities. This research, however, is not the only educational research conducted in Sweden. A cautious guess would be about 60 percent. The rest is financed from other sources.

However, much development work - apart from the central curriculum development work which is undertaken by a combination of the National Board of Education and the County Education Committees (CEC) - is undertaken at the CEC and LEA levels.

2. How is R and D for school improvement disseminated?

In **Hungary**, this is done through the teacher newspaper, the ordinary press, teacher journals, and leaflets which are produced by the central authorities and distributed via the county education departments to the county institutes and to the schools. There is considerable doubt about the effectiveness of the written form of communication. Oral communication through INSET and the county inspectors is found to be more effective.

In **Sweden** the most important channels through which R and D results can be disseminated are:

. commentary material linked to the curriculum

. other service material for the schools

. information for school leaders

. books from research projects, published either commercially or - which is more common - through NBE at low or no cost for the schools and teachers

. information sheets from research projects written directly for teachers

. reports from research projects, regional and local development projects and from central (national) evaluation studies and from curriculum development work

. articles in teacher journals.

Within NBE there exists a data base in which basically all the material mentioned above is available on line for schools. The reports etc. can be borrowed, bought or obtained free of charge from either the NBE, CEC or libraries.

The potentially most powerful channel for dissemination of R and D results is the commentary materials linked to the national curriculum. The Riksdag has stated that NBE is responsible for a continuous development of the curriculum and that it should support schools with commentary material that should be based on research and development work. It is however not mandatory for the schools to buy these materials, nor are they mandatory for the teachers to study.

Dissemination of R and D results in writing without any defined connection with other activity has proved to be a weak instrument for school development and improvement. Recently, a study was undertaken of teachers in the compulsory school (focussing on their values and beliefs about the teaching profession as well as about the gaps between what they want and what they get to help them in their work). The written material mentioned above (and is was linked to the curriculum) was mentioned only by very few as an important channel for getting knowledge about the curriculum and about teaching methods. Teachers seem to rely solely or almost solely on oral communication with colleagues and on the study days and other in-service activities for their own professional development.

3. Assuming that simply making knowledge about R and D findings available through written dissemination is not sufficient to gain their use, what further steps are taken?

In both countries it would appear that written communication is insufficient.

In **Hungary** the County Institutes of Education organize teacher meetings. R and D persons are invited to give talks and persons from the County Institutes also give talks. The National Institute of Education organizes central meetings of inspectors to inform them of R and D and to arrange for them to pass them on to school principals and teachers as they visit each school.

The County Institutes of Education organize different expert teams in order to facilitate the dissemination of information. In a typical setting curriculum experts, advisers, teaching aid designers, evaluators, curriculum experts and teachers are involved. Where teachers join in development work activities they may receive more pay. These teams are organized on a temporary basis. It is too early to judge the effectiveness of this means of dissemination partly because of their newness and also because of financial constraints. The main avenue for dissemination is INSET (In-Service Teacher Training) as organized by the County Educational Institutes.

One of the main problems is to change teachers' negative attitudes towards reform. After years and decades of "conforming" it is difficult for teachers to have new and bold ideas and to express them. It is, however, the personal contact with teachers and the oral dissemination of ideas and R and D results which is expected to have more influence than other forms of dissemination.

One major avenue which should serve dissemination purposes is pre-service teacher training. In Hungary, the pre-service teacher training institutions are conservative and tend to act as a brake rather than an accelerator. They view their main task as that of producing good subject matter knowledge in the future teachers and pay little attention to the 'pedagogical knowledge'. They do not reject the idea of reform but neither do they support it. Thus, much remains to be done in the area of dissemination for the successful application of R and D for school improvement.

In Sweden in-service education is also the major vehicle for school improvement. In-service teacher training is the joint responsibility of the National Board of Education and the National Board of Universities and Colleges. A substantial part of the in-service teacher training is given within universities and schools of education although an increasing amount of it is provided for by the municipal education authorities. State grants for local development work in schools are given, stating that at least 60 percent but not more than 80 percent should be used for in-service teacher training. To this should be added that five "study days" per year are compulsory for all teachers.

Priorities as to the main areas in which state grants are given to in-service teacher training, are stated by NBE. During the eighties, a shift in policy for INSET has meant that more emphasis has been put on the general goals for schooling, above all on what is called "The school is for everybody" and as a consequence of that, emphasis on means and methods for pupils that need extra support. This has been done at the expense of subject-matter INSET except, above all, computers in education and in later years (as a result of the IEA-mathematics study from 1980) on mathematics.

These national INSET priorities have been very powerful as instruments for the content of INSET. It can be shown that these INSET courses, both locally arranged ones and those given through universities have had an impact on teacher attitudes and on the acceptance from more and more teachers of the very idea of "A school for everybody". This is especially true for upper secondary school, where, it must be admitted, there still remains most to be done in this respect.

In a study of the written materials used in these (academic) INSET courses it could also be shown that most of the mandatory literature consisted of research reports, many of which were summaries of results from NBE-financed research projects. An interesting pattern could be seen in that the materials were, to a very large extent, "local". Each university defined what was presented at INSET courses according to the research carried out within that particular university. In practice this means that although the problem areas are national (the titles of the INSET courses are identical) the actual content of the courses given and the policy and philosophy transmitted could vary substan-' tially. This is, however, more true for the subject-oriented INSET than for INSET dealing with the general goals for schooling.

Thus INSET built on national priorities to which local educational authorities adhere, can be powerful instruments for the dissemination of research and development results.

There are five mandatory study days for schools and teachers per year. It has been shown that compulsory school teachers regard them as very important information channels especially for curriculum matters and for teaching methods. Their importance has not been recognised until recently.

The study day programme is usually the responsibility of the school leaders. The school leaders' importance as change agents in school is widely recognized. Without a strong pedagogical leadership and change-oriented school leaders, 'bureaucratic cementing' would tend to take place in Swedish schools. Thus, the form and content of the study days will be studied intensely during the year to come. If more of research and development results could form the content of the study days, a new and potentially powerful channel could be opened up.

According to the yearly reports given from research projects, researchers are often engaged in study day programmes. Researchers are also very often engaged in the INSET courses given by the universities, as can be seen from the above.

It should be mentioned that the INSET programmes at the universities are run by a special body, linked to the university but formally belonging to NBE. The NBE hands in the budget requests to Government and the Riksdag for INSET (and gives the INSET priorities as well).

As has already been mentioned, from 1989 INSET will be compulsory for all teachers in the comprehensive school. The educational authorities want to make sure that those teachers who received their basic training before 1988 (as class-teachers for grades 1-3 or 4-6 or as subject teachers for grades 7-9) should acquire the competence to be teachers in grades 1-7 or in grades 4-9.

An important role in having R and D implemented is played by school leaders (school principals and deputy principals). As has been mentioned, principals - or with a broader term - school leaders and school leadership are vital for the development and improvement of schools and instruction. Sweden has an extensive programme consisting of four main parts so as to ensure a strong school leadership. The four parts are:

1. Recruitment programmes. These are administered by the local education authorities and are aiming at finding interested and competent applicants for school leader jobs. These programmes have been particularly important in recruiting women;

2. Introductory programmes. These are also administered by the local education authorities and are given to newly appointed school leader;

3. Extensive basic training programmes. These are administered by the NBE and are state financed;

4. Continous in-service training programmes. These are administered both by local and regional authorities and are financed jointly.

Research and development work and results form an important part particularly in the extensive basic pre-service training. However, it is recognised that school leaders are one of the most critical channels through which R and D could be disseminated and used. It is felt that their role as pedagogical leaders must be strengthened. Too many of them are more engaged in administration than in actual leadership. One other reason for their difficulty to act as a leader is the fact that they all are recruited from the teacher corps. Thus, a school leader is regarded more as a colleague than as a head. This unclear role seems to reduce their possibilities - and perhaps willingness - to take on a strong responsibility for school improvement activities.

They should, however, be regarded to some extent as a specialist group. They should be given the necessary support from the municipal education committees, the county education committees and from the NBE. In this way they can become a key link between both policy and research and development work.

4. Is the use of R and D for school improvement a specialized field with its own staff and institutions (like Regional Laboratories in the U.S.)?

In Hungary and Sweden the answer is No. In Hungary, it is the staffs of existing institutions which conduct the work with primary emphasis on INSET and the inspectorate. It is the County Institutes of Education which are responsible for INSET and the inspectorate. In Sweden, it is also existing institutions (see Figure 2) which are responsible for school implementation. It is the National Board of Education which is alone responsible for research follow up and for the dissemination of central R and D information. Together with the existing LEAs and CECs, the NBE is responsible for the implementation of local development work.

5. How effective are the various systems studied in using R and D for school improvement?

In the Hungarian system, some improvements work in some schools and not in others. Three examples may be of interest.

In one development project for small schools, audio-tapes were produced as materials for teachers and pupils. These were very practical and fulfilled a need. They proved to be very popular with both. The same is true for a project on item banking where teachers could select already tried-out items for use in their regular assessments. Again, this was an R and D product which was of immediate practical use to teachers. Both products were disseminated via in-service training and inspectors.

A third project concerned first grade reading. One central program had existed for many years and there was evidence that reading comprehension left much to be desired. The National Institute of Education developed five alternative reading programs with evidence that, in the long run but not in the short run, they produced higher achievement. The alternative programs were not, in general, accepted by the schools because there was no visible immediate progress as there had been under the original one central program. The parents, too, complained about the alternative programs, thus reinforcing the teachers' opinions.

Two examples come from Sweden. The first was in mathematics. As a result of a national monitoring exercise (Marklund, 1987) it was felt by all levels of the educational hierarchy that the 13 year olds in Sweden were performing poorly in mathematics when compared with other countries. There was much work undertaken in INSET and local school development activities. These activities had a good effect in nearly all schools.

The second example started at a very local level and was inspired by the Bielefeld Reading Project. In Sweden it is called "A quarter a day". In a school in southern Sweden some teachers in grades 1-3 learned about the Bielefeld method, became inspired and started to work with parents in their own school. The Parents Association became interested and they started to develop material including a video that was shown on Swedish TV. In this case, local development work spread like rings on water and is still operating. Here, there were teachers who were willing to test something new; parents, after some hesitation, accepted to take part and really give their children that "quarter of an hour each day"; strong support came from the Parents Association, and later there was attention from media, above all Education TV (an independant part of Swedish Radio and Television). The work received its official sanction as one of the authors of the study material is a civil servant at a County Education Committee.

Even in countries with small populations (i.e. Hungary and Sweden), it is at the county or local education level that the contact is made with each school and it is felt that oral communication at this grass-roots level is most effective. In all cases, the central level takes care to train, and disseminate information to, the persons responsible for this communication at the grass-roots level. Nothing akin to the regional laboratories in the U.S. exists.

Before proceeding to overall conclusions it is important to quote what Inger Marklund handed in as a summary of some major findings of a 1980 governmental committee on an evaluation of R and D in local school development and improvement:

- research results are more often used at the central educational level, in policy making and in curriculum development work
- thus research reaches teachers and schools more often indirectly than directly

- without a change-oriented teacher corps, research results are very unlikely to reach teachers at all
- expectations of research are often unrealistic; teachers want the answer to the question
- a local school development needs supporting agencies, which in Sweden are mainly the County Education Committees
- any supporting agency must have a broad and deep competence in both development and evaluation
- research that deals with a reasonably well-defined area, where teachers are asking for information and knowledge and where research provides new knowledge is more likely to have an impact on educational practice. This has been particularly true for research on physically and mentally handicapped children in school.

Conclusions

Some principles

There would appear to be several principles which should be observed if school improvement is to take place.

1. Mechanisms for "up and down" communication

There is most hope for school improvement if a problem, or set of problems, is recognized to exist at all levels of the administrative hierarchy from the school level to the ministry level. This provides a known common ground on which to build the efforts of all concerned.

This common awareness involves two forms of communication. The first is a two way communication: up and down the hierarchy. Teachers and school principals must see that their problems (both current and foreseen) are recognized at the higher levels in the administrative hierarchy. A mechanism must exist and be seen to exist for these problems to be made known. This must be undertaken systematically and in such a way that teachers can formulate their ideas.

In both countries reviewed in this paper, such a mechanism clearly exists. Problems for research and suggestions for innovation and experimentation are deliberately solicited from schools. There is also feedback from the higher levels to the schools on what action is being undertaken. The schools have the feeling that the higher levels care.

The second form of communication is that new ideas and new research findings are made known to all levels of the school system. Deliberate steps can be undertaken to disseminate information not only through the newspapers, radio and television but also through the inspectorate, through in-service training (and through on-service training where it exists), through special newsletters/bulletins from the ministry to all schools and teachers, and through special journals for all schools.

It is also clear that more information is needed on the effectiveness of the written word going out to all teachers. How many read written communications of this nature is not well known. Similarly, it would be desirable to have more information on the effectiveness of other forms of communication e.g. written communication plus teacher meetings and so on.

2. Direct contact with teachers

The important link in the chain for school improvement is that with the school principal and the classroom teachers. Although dissemination through the written word is popular, it would appear that the most effective dissemination is through oral communication. INSET and the inspectorate are the key element in dissemination. Thus, the links between the inspectorate (or its equivalent) and the school and between the in-service teacher trainers and the teachers (on a regular and compulsory (?) basis) at the local level are crucial. Presumably, the local level in the U.S. sense would mean at the district level.

3. Compulsory in-service training

When in-service training is optional, it is the 'better' teachers who tend to go to such courses. Hungary and Sweden arrange it that pupils have a number of days holiday out of the school year which the teachers do not have. They attend in-service courses where in-service training involves practical work such as the production of curriculum materials and/or assessment materials. Much innovation and experimentation is needed to improve in-service education.

On-service teacher training is being suggested in some countries. This may be compulsory or voluntary. Teachers from neighbouring schools meet on a regular basis (once a week to once a month) in their free time to discuss the content and methods of their teaching. They learn from each other. When they have a common problem for which they have no good solution, they ask the local inspectorate for help. In some cases, these teachers meet in 'Teachers' Centers' and, in other cases, in one of the schools in the local area.

4. Practical relevance of R and D products

The R and D products must be seen to be of practical relevance to the daily work of the school and teacher (and to the parents). The long term and short term effects must be clear. Successful implementation is most often connected with materials and aids of direct and immediate use to the teachers. Of most importance is that the school principals and teachers must see the products to serve their own interest. R and D which is perceived as an "academic game" for university staff to win points for their own promotion or which is written in 'academese' or 'technical jargon' is viewed with great suspicion.

5. A reasonable teacher load and teacher interest

Teachers must not be overloaded. Improvements must not demand herculean efforts by the teacher (is it true that the self-perception of a teacher is that he/she is overworked, underpaid, and under-appreciated?); nor should improvements require a charismatic prime-mover. Too many innovations have failed once the prime-mover has gone. If more is demanded of the teacher than the teacher thinks is worth while, then the teacher will, in general, not do it.

Where innovation and development has been suggested by the school and the school is involved in the development, it is useful to have reward/encouragement mechanisms for the teacher (e.g. released time, pay bonus). The same is true for the headmaster. In other words, interest must be encouraged and not stultified.

6. A central core curriculum

At mass education levels (i.e. where 100 percent of an age group is still in school) in systems which perform well there is a certain national core curriculum. This can range from 50 to 90 percent of the total curriculum. The two countries used in this paper both have this. It is also to be noted that even England - a bastion of decentralisation in education - has now introduced a national curriculum to try and ensure good minimum standards of education. The notion of "let a thousand flowers bloom" may result in 100 blooming very well but what about the weakest 250?! Connected with the notion of a core curriculum is the fact that teachers and school principals appreciate information on how their classes or schools achieve compared with similar schools. As systematic monitoring occurs, it helps to have this feedback mechanism which, in turn, interests teachers in R and D activities.

7. Good pre-service teacher training

Where there is a core curriculum and where pre-service education ensures that the teachers know the content of the subject matter they have to teach and there is some basic pedagogical training, then science and math achievement as measured by valid international tests is higher. Both countries agree that their core curriculum and strict pre-service training does help to ensure good minimum standards.

Dotting the i's and crossing the t's

Principles are one thing. Procedures to ensure that the principles are realized are another. The procedures must fit to the social and school culture of each system. At the risk of being presumptuous it would perhaps be useful if the U.S.A. authorities (district, state, federal) were to answer the following questions:

1. How are the themes for R and D and for Regional Laboratories decided? Are schools canvassed about their problems now and problems they think may arise in the future? Are districts

canvassed? Are state chief-school-officers canvassed? Are universities and teachers' colleges canvassed? How regularly? If so, what criteria are used for deciding on priorities? Who decides?

2. When the R and D and Laboratory budgets are divided up, how much goes to schools for co-ordinated innovation which they have suggested and how much to the other levels in the administrative hierarchy and how are they involved in the research, development and implementation process?

3. How are ideas and information made available to the school principals and teachers? How well is this done? Is great emphasis placed on the important link of district level personnel and the schools? How good are the local inspectors (or their equivalent)? Do they take good ideas and problems from schools and pass these up the hierarchy? Is this undertaken in a systematic way? Do up and down communication mechanisms exist and how effective are they?

4. Are a variety of forms of dissemination used? - The media, teacher journals, teacher newspapers, SET materials as used in Australia and New Zealand, inspectors, in-service/on-service training! Which, in general, is the most effective combination?

5. Are the R and D products practical or, at least, perceived to be of practical use to teachers? Should regional labs (one per theme) be abolished and smaller mechanisms created all over the country for direct contact with schools? Should the R and D labs be producing practical suggestions or products as a result of their work and then these can be used at each of the many local centers (mechanisms)?

6. How are national minimum standards of teacher knowledge ensured as a result of pre-service training? Specifically, for example, has every 8th grade biology, chemistry, or physics teacher a specified and required mastery of the subject-matter knowledge?

7. Is in-service training compulsory and does it involve the teachers in practical activities?

8. What is being done to initiate a core curriculum?

There are no simple answers to school improvement. Both of the systems examined in this paper are not fully happy with their mechanisms for school improvement and they do seem to be trying new ways all the time. The awareness of problems and the will to solve them at all levels of an educational system are paramount in importance. This awareness entails interconnection at all levels of the hierarchy. The final link in the hierarchy with the schools is crucial. If the teachers are not listened to, communicated with, and encouraged in a systematic and regular way, little can be expected. Above all, teachers must perceive suggested changes to be in their own self-interest.

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